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ABSTRACT

Three basic conceptual issues that underlie studies of the content of instruction are explored in this paper. These include the need to reach a common definition of the concept of content of instruction, to undertake a serious analysis of the taxonomies presently employed in studies of content, and to critically examine the units of observation employed. These issues, which cause serious communication problems among researchers, are discussed in detail, and suggestions for their resolution are offered. (Author)

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CONCEPTUAL ISSUES

IN THE CONTENT/STRATEGY DISTINCTION

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Abstract

Three basic conceptual issues which underlie studies of the content of instruction are explored in this paper. These include the need to: (1) reach a common definition of the concept of content of instruction, (2) undertake a serious analysis of the taxonomies presently employed in studies of content, and (3) critically examine the units of observation employed. These issues, which cause serious communication problems among researchers, are discussed in detail and suggestions for their resolution are offered.

Contents

CONCEPTUAL ISSUES IN THE CONTENT/STRATEGY DISTINCTION[1]

Donald J. Freeman[2]

There is a growing awareness that studies of the impact of teaching on student performance must take into account content of instruction (what is taught) as well as instructional strategies (how something is taught). The central role of content analysis in investigations conducted by Airasion and Madaus (1976), Jenkins and Pany (1976), Armbruster, Steven, and Rosenshine (1977), Porter, Schmidt, Floden, and Freeman (1978), Grosser (1978), Perkins and Buchanan (1978), and Buchanan and Milazzo (1978) illustrates this trend.

Emerging areas of inquiry often generate challenging conceptual issues, and increased attention to content of instruction in research on teaching is no exception. The major purpose of this paper is to explore three crucial conceptual issues which underlie efforts to study the content of instruction: (1) the need to define the concept of content; (2) the need to isolate a limited number of acceptable taxonomies of content in a given subject matter area; and (3) the need to identify an appropriate unit of observation. It should be noted from the outset that the intent of the paper is to raise questions suggested by these

[1]This paper represents the author's attempt to represent ideas expressed during a series of meetings of the Outcomes Measurement Group within the Institute for Research on Teaching. Thus its content is due in no small measure to input from members of this group - Andrew Porter, William Schmidt, Robert Floden, and Jack Schwille. The author is also indebted to Teri Kuhs without whose constant assistance and support it would never have been finished.

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three issues, not to provide answers. It should also be noted that the range of professional literature dealing with these issues is vast; thus, no attempt will be made to provide a comprehensive review of literature in this report.

The Need to Define Content

Virtually everyone associated with education has some notion of what is meant by "content of instruction." It is clear, however, that this meaning varies dramatically from one individual to the next. Thus, it is not surprising that some of our colleagues within the Institute for Research on Teaching insist that content of instruction can not be differentiated from "instructional strategies"; we feel otherwise. The difference between their stance and ours is probably due to the fact that their concept of content differs from ours. These conceptual differences, which cause communication problems, suggest the obvious need for a clear and generally accepted definition of content which will be shared by those conducting research in this area.

We have not yet been able to establish a precise definition of content. However, we have been able to identify some of the parameters which will ultimately characterize our definition. Our deliberations suggest that content of instruction: (1) encompasses the full range of intended educational outcomes, (2) is a dichotomous rather than continuous variable, (3) focuses upon intended outcomes rather than actual products of instruction, and (4) must be defined from a particular point of view or perspective. Our work in the area of content of instruction has focused on mathematics, but we believe these parameters would apply as well to other subject areas.

Content as Encompassing Full Range of Intended Outcomes

A Prevalent view suggests that content is that body of cognitive knowledge which may be passively assimilated by the learner (e.g., Parker & Rubin, 1966). We are anxious to avoid narrow boundaries such as these because they fail to represent adequately alternative points of view which might be held among teachers. In our view, content can include the full range of intended educational outcomes which might be successfully assimilated by the learner. (This concept of content allows for the inclusion of such affective outcomes as a positive attitude toward mathematics and such processes as the ability to apply a particular heuristic in problem solving.) We also believe that content is not implicitly tied to any particular approach to instruction, such as that suggested by the contrast between inductive and deductive strategies.

Content as a Dichotomous Variable

We believe that a precise definition will treat content of instruction as a dichotomous rather than continuous variable. We use the terms "content covered" and "content emphasis" to distinguish between these two alternatives. In measuring content covered, we use a dichotomous scale; that is, we enter a "1" or "0" in our records, depending on whether or not a particular content area (e.g., the concept of a triangle) is covered in a given lesson, textbook, or test. Content emphasis, on the other hand, is measured along some well-defined continuum. Examples on content emphasis measures include the amount of time spent on a given lesson, the number of pages in a textbook, and the number of items on a test which focus on a given topic. Thus, our concept of content emphasis is roughly equivalent to Wiley and Harnischfeger's (1974) concept of allocated time and Buchanan and

Milazzo's (1978) concept of content density.

The need to distinguish between content covered and content emphasis is not immediately apparent. Ultimately, however, this differentiation must be made to provide a clear distinction between content (what is taught) and instructional strategy (how something is taught).

Measures of content emphasis encompass more than simple differences in the extent of content coverage. Variations in time spent on a given topic, for example, are almost always accompanied by identifiable differences in instructional strategies, such as the amount of drill and practice which is provided. Time variations are also linked to differences in student aptitude, the minimal time needed for the student to learn what is being taught. Thus it is impossible to explain precisely the influence of content emphasis in observed relations between measures of content emphasis and student achievement such as those reported by Wiley and Harnischfeger (1974), Grosser (1978), and Buchanan and Milazzo (1978). Any explanation of these relations must include at least some reference to differences in other variables, such as instructional strategies and student aptitude. When content of instruction is treated as a continuous rather than a dichotomous variable, we would have to agree with our IRT colleagues that content and strategy cannot be distinguished.

Content as Intended Instructional Outcomes

The third parameter suggested by our efforts to define the content of instruction is that content must be viewed in terms of intended, rather than actual outcomes of instruction. Suppose, for example, that a teacher presents a series of problems of the following type in an attempt to enhance student understanding of the associative property.

6 + (8 + 3) =

a. (6 + 8) + (6 + 3)

b. (6 + 8) + 9

c. (6 + 8) + 3

Further, imagine that despite this practice and despite further explanations from the teacher, students are still unable to solve the problems at the end of the lesson. Under these circumstances, would the content of this lesson be the "associative property" or would there be "no content," as the students' performance might suggest? The answer, which is clearly suggested by the parameter, is that the lesson deals with the "associative property." In other words, content must be defined in terms of what the teacher intends for students to learn, not in terms of what they actually learn. What students actually learn is obviously a function of a host of variables (e.g., the appropriateness of the instructional strategy, student motivation, and student aptitude). Thus, any definition of content of instruction which is phrased in terms of actual products rather than intended outcomes precludes the opportunity of drawing a clear distinction between content and instructional strategy.

To return to the preceding example, suppose that the students completely miss the point of the lesson and successfully solve each problem by simply finding the sum of an alternative which matches the sum of the stated number sentence. Under these conditions, would the content of the lesson be the "associative property" or "single-digit addition"? The answer depends on which perspective one adopts, that of the teacher or that of the student. Thus we arrive at the fourth parameter, the need to define content from a particular perspective.

Defining Content from a Particular Perspective

We believe that content cannot be defined in some absolute sense. Imagine, for instance, that one must determine the content of a given classroom lesson. What source of information should be considered? Should the teacher be asked what s/he intends for students to learn? Should one examine what actually happens during the presentation of the lesson, including the teacher's actions and instructional materials a student is asked to study? Should students be asked to describe what they are trying to learn during the lesson? Or should the post-test associated with the lesson be examined to determine what learning outcomes the test is attempting to measure?

With the possible exception of the content analysis of the post-test, which limits content to those intended outcomes which can be measured, each of these sources should provide a valid index of the lesson content. Yet it is clear that the results of the content analyses are apt to vary from one perspective to another. What the teacher intends for the students to learn, for example, may vary dramatically from what the students are trying to learn during the lesson. Differences of this sort suggest that reliance on only one source (teachers, students or classroom events) is likely to result in an incomplete description of the content of a given lesson. These differences also support the notion that content of instruction must be defined from a particular perspective (such as that of the teacher or that of the student).

Our research focuses on factors which influence a teacher's selection of the content of instruction; therefore, we are most concerned with defining content from the teacher's perspective. Given this perspective and the desire to treat content in a comprehensive manner, we are moving toward a definition which can be represented graphically by the intersection between what the teacher intends for students to learn and those classroom events (teacher actions and/or instructional materials used) which the teacher judges to be consistent with these intentions. The teacher's intentions might be determined prior to the lesson or they may emerge spontaneously during the lesson. If a behaviorist were to study a teacher's intentions, he would probably ask the teacher to indicate what s/he hopes the students will be able to do following a lesson that they were not able to do before.* The behaviorist might also ask what instructional events, if any, occur during a lesson presentation which are consistent with these intentions.

A teacher's intentions may focus on any type of student learning: understanding a concept, developing a more positive self-image, improving one's ability to apply a particular type of decoding skill, etc. Suppose that a teacher plans and completes a lesson in which the intended outcome is increased skills in single-digit addition. Suppose, too, that embedded within the lesson is practice with listening and speaking skills, appropriate behavior in a peer group, or whatever. All of these activities would be a part of the instructional strategies, but they would not be a part of the content if the teacher's single goal for the lesson was single-digit addition. If, on the other hand, listening skills were a part of the teacher's goals for the lesson, then the instruction provided in that area would also constitute part of the lesson content.

Defining content from a teacher's perspective is most consistent

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*This description closely parallels Carroll's (1963) concept of a "task."

with our basic desire to study factors which influence a teacher's selection of content. We recognize, however, that it is possible to formulate a definition from some other perspective, such as that of students, parents, or principals, or from some broader perspective, such as the general goals of schooling.

Summary

We are not yet able to provide a precise definition of the concept of content of instruction, but we have formed several beliefs and identified parameters concerning this concept, namely, that this concept (1) encompasses the full range of intended educational outcomes, (2) should be treated as a dichotomous rather than a continuous variable, (3) should focus upon intended outcomes rather than actual products of instruction, and (4) must be defined from a particular point of view or perspective. To the extent that this paper serves its intended purpose, the feedback we receive should facilitate refinements in our concept and move us toward a clear and generally accepted definition of content which might be shared by others conducting research in this area.

Identifying and Developing Useful Taxonomies

Assuming that it is possible to develop a standard definition of content of instruction, the researcher must confront the question of what taxonomy should be used to classify the content of a given subject matter area. This question appears to have a simple answer. The number of ways in which objects or events may be grouped is limitless, so all taxonomies are arbitrary. Thus it seems reasonable to assume that researchers should develop taxonomies which best fit their unique purposes. Indeed, in many cases, that is exactly what has happened. With the subject matter area of elementary mathematics, for example, at least 12 different taxonomies are reported in the literature (see the reference section of this paper). These taxonomies have been designed to serve a variety of purposes, including the classification of textbooks, test development, instructional planning, measuring the content validity of tests, and program evaluation.

To this author's knowledge, no two researchers have ever used the same taxonomy, despite the fact that they may have shared a common purpose. Our research group within the IRT, for instance, has designed a taxonomy of mathematics content to use in determining similarities and differences in the content covered by standardized tests and textbooks, while researchers at the Southwest Regional Laboratory have developed a different taxonomy to serve roughly the same purpose. Because the two groups have used different taxonomies, the opportunity for comparisons of findings has been severely limited.

Communication problems of this type lie at the heart of the taxonomy selection issue. If researchers with common goals continue to develop and adopt different taxonomies, it is unlikely that a consistent and comprehensive body of literature regarding content of instruction will ever emerge Thus it would be desirable to identify a limited number of acceptable taxonomies for a given subject matter area; the smaller the number, the greater the ease of communication. Ideally, every researcher would use a single taxonomy.

An Example from Biology

The ideal of using one taxonomy has been realized in the field of biology, which has a history of taxonomic development dating back to the ancient Greeks.

> Use of the seven basic Linnean levels is <u>required by convention</u>, that is, no animal is considered to be satisfactorily classified unless it has been placed implicitly or explicitly in some definite group at each of the seven levels. (Simpson, 1961, p. 18. Emphasis supplied by author.)

Consider the advantage of this convention. Although the purposes of a given biologist might be better served by some other taxonomy, such as ecological classification (e.g., saltwater fishes), it is obvious that applying one form of classification to all organisms greatly enhances communication among <u>all</u> biologists.

It may not be possible to develop a single taxonomy which would be used by everyone who studies the content of a given subject matter area, but it is clearly desirable to identify a limited number of content taxonomies which might be used. Some might argue that this limitation will occur naturally as research progresses in this area, that the better taxonomies will be widely adopted, while the weaker ones will disappear. We would counter, however, that researchers should be able to increase the rate of taxonomic evolution by identifying the qualities of strong taxonomies and supporting those taxonomic developments which incorporate these characteristics. Although our deliberations in this regard have not yet reached the definitive stage, two ideas have emerged which seem promising. Assuming that those taxonomies which serve the widest range of purposes should prevail, then taxonomies with certain conceptual bases seem more promising than others. Further, those taxonomies which are hierarchically structured seem more functional than those which are limited to one level of generality.

Selecting the Most Useful Taxonomy

Let us examine the logical base of the criterion we have adopted for selecting taxonomies. This base is described in straightforward terms by Simpson (1961).

> 1. A major function of classification is to construct classes...about which we can make generalizations.
>
> 2. The classes are constructed in connection with a particular purpose, which depends on the kinds of generalizations that are considered pertinent.
>
> 3. Some classifications pertain to a wider range of inductions or to more meaningful generalizations than others and are in that sense "better", or more useful. (p. 25)

In greatly simplified terms, imagine that taxonomy A adequately serves purpose A, while taxonomy B adequately serves both purpose A and purpose B. Is it not reasonable to conclude that taxonomy B is "better" or "more useful" than taxonomy A? This conclusion might not logically follow for someone who is interested solely in purpose A; it does follow if one adopts the more general perspective suggested by the need to limit the number of acceptable taxonomies. Viewed from the more general perspective, the adoption of taxonomy B should not only satisfy the needs of those interested only in purpose A, but should also enhance communication between this group and those who are concerned primarily with purpose B. If this "which-is-more-useful" criterion were used to judge the relative merits of alternative taxonomies, the conceptual base which undergirds some taxonomies would appear more promising than that which supports others.

At their most basic level, taxonomies are used to identify members of a given class. Taxonomies based on nominal scales serve this purpose as well as any others. Thus, a librarian concerned with identifying and labeling individual books so that they might be stored and readily retrieved is served as well by a nominal system of taxonomy as by any other. Likewise, we discovered that a nominal system best suited our efforts to determine the content covered in commonly-used standardized tests and mathematics textbooks so we deliberately developed a taxonomy of mathematics content based upon a nominal scale. (Our principal problem was to determine an appropriate level of generality for our categories, not to design a more sophisticated taxonomy.)

At a somewhat more advanced level, taxonomies may be used to identify and order members of different classes. Taxonomies of this sort are implicitly based upon an ordinal scale. Bloom's (1956) taxonomy, for example, describes a logical order among classes of cognitive tasks which demand increasingly complex mental processes. This kind of taxonomy is well-suited to identifying general differences in the levels of cognitive functioning demanded by a given test or textbook, and four of the 12 taxonomies of mathematics content are based in part on Bloom's taxonomy.

The taxonomy of learning proposed by Gagné (1977) is also ordinally based, with learning at one level represented as a prerequisite to learning at a higher level. The main appeal of this taxonomy is that it seems to suggest an optimal sequence of instruction, namely, to begin at the lower levels and systematically progress to the higher ones (e.g., teach concepts before rules). If it were possible to prove empirically that this sequence is, in fact, optimal (using a research strategy similar to that suggested by Eisenberg and Walbesser, 1971), the general utility of Gagné's taxonomy would be greatly enhanced. Unfortunately, however, it does not seem possible to provide convincing evidence, and Gagné's position has been strongly challenged by other respected educators such as Bruner (see Shulman, 1970).

Another limitation of both Bloom's and Gagné's taxonomies is that they are not particularly well suited to identifying specific similarities and differences in content covered by either tests or textbooks. This purpose seems better served by nominally-based taxonomies which have more specific categories. Thus, to use the terms of our criteria, these taxonomies serve purpose B, but not both purpose A and purpose B.

At their most advanced level, taxonomies may be used to identify, order, and explain the relations among members of different classes. Taxonomies of this kind are based on ordinal scales which parallel natural orders that have been empirically confirmed. The generally accepted taxonomy in biology, for example, is based not only upon similarities among individuals, but on evolutionary relationships, as well; empirically confirmed ideas suggested by evolutionary theory explain why the relationships depicted in the taxonomy occur. The same is true of the generally accepted taxonomic system in geology, where the order set forth parallels empirically-established principles of the origin of rocks. The inherent strength of taxonomies of this sort is that not only do they account for the more obvious associations suggested by similarities among members of a given class, but they generate many empirically verifiable inductions as well. Consider a miner, for example, who is armed with a classification system based on physical similarities among rocks (e.g., rocks which contain copper). This miner is at a disadvantage compared to the miner who uses a classification system which parallels the order suggested by the theory of the origin of rocks; only the latter miner will be able to infer the likely presence or absence of copper-bearing rocks in a given area from his classification of other rocks in that area which are readily observed.

The generally accepted taxonomies in biology and geology serve general purpose C (explanation and inference) AND general purpose B (ordering) AND general purpose A (identification). Thus, as Simpson

(1961) asserts, there is a general consensus that classification by evolutionary relationships is the "best" method of classifying animals.

So far, taxonomies used to classify the content of given subject matter areas such as mathematics seem well-suited for purpose A (identification) OR purpose B (ordering), but not for both. It is also apparent that none of these taxonomies approaches the level of development suggested by purpose C. It is not difficult to imagine, however, how such a taxonomy might ultimately evolve. Suppose, for example, that it were possible to develop a taxonomy which reflected the optimum order of instruction in a given subject area. Suppose, too, that ideas suggested by Piaget's theory of cognitive development had been empirically confirmed. If the instructional sequence suggested by the taxonomy paralleled that suggested by confirmed stages of cognitive development, then the theory of cognitive development would explain "why" this sequence of instruction was optimal. The taxonomy, at this stage of development, would be analogous to those used in biology and geology.

It is highly unlikely, however, that we will arrive at this stage of taxonomic development within this, or perhaps even the next, century. More immediate benefits are apt to accrue from serious efforts to develop taxonomies which serve a variety of lower-level purposes. It should be possible, for example, to develop taxonomies which reflect some meaningful order among classes and which are detailed enough to identify significant similarities and differences among various content sources.

Hierarchically Structured Taxonomies

One form of ordering among classes which seems especially promising is the conceptual hierarchy. One of the principal reasons that existing taxonomies serve a limited range of purposes is that, in almost all cases, categories are based on single levels of generality. Levels range from the very general to the very specific; one taxonomy reported in the reference section, for example, identifies extremely broad areas, such as reading and mathematics, while another has 42 categories for the classification of a single-dimension, crossed with two other dimensions with up to 10 categories each (Buchanan, 1976). The reason for such vast variations in the level of generality in different taxonomies is obvious. The purpose of some researchers is best served by more general categories; the purpose of others by more specific categories.

As mentioned earlier, the primary problem we faced in selecting a taxonomy for our research was determining an appropriate level of generality for our categories. At one extreme, we found taxonomies with categories too general to detect significant differences in the content covered by the standardized tests we were analyzing. At the other extreme, we found taxonomies with categories too specific to suggest topics which teachers could reasonably be expected to focus on in planning instruction. (Ultimately, we decided to develop our own taxonomy, with categories specific enough to identify significant differences, yet general enough to be meaningful to teachers.)

Perhaps problems of this sort would be alleviated if categories were not based on single levels of generality. Suppose that it were possible to develop a content taxonomy which was hierarchically structured. Consider, for example, the following hierarchy for one area of mathematics content:

Mathematics

Basic computational skills - understanding concepts - application

subtraction - multiplication - division - addition

subtraction w/o borrowing - subtraction with borrowing

The hierarchical relationship among the categories in this incomplete taxonomy is obvious. Any task which is classified at the lowest level in the taxonomy (e.g., subtraction with borrowing) is automatically classified in one of the categories at each of the higher levels. The advantage of a taxonomy of this sort is readily apparent; a researcher can use content categories that represent the level of generality which best suits his/her purposes and still maintain meaningful communication with others who have elected to use different levels of generality. It seems that those who are anxious to develop taxonomies of the content of instruction in a particular subject matter area should at least consider the hierarchy concept.

Summary

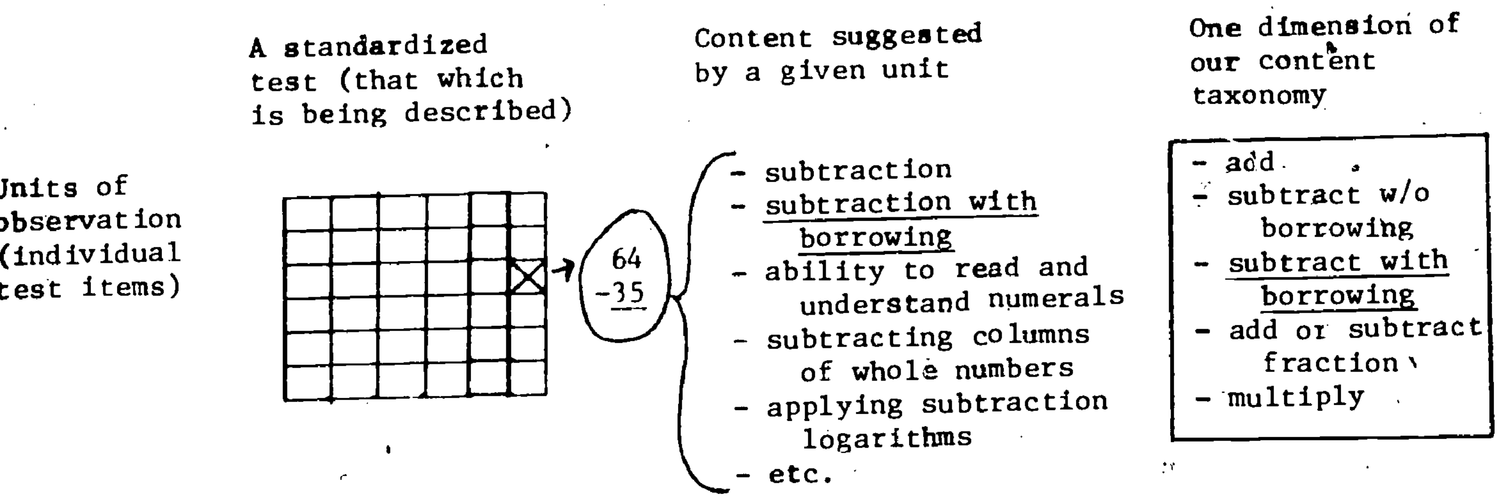
The desire for meaningful communication among researchers studying the content of instruction in a particular subject matter area seems to suggest the need for a limited number of acceptable taxonomies; to the extent that researchers begin to adopt common taxonomies, communication should be greatly enhanced. It is possible to compare the relative merits of alternative taxonomies by determining which one effectively serves the widest variety of purposes.

We should begin to encourage the development of content taxonomies which describe some meaningful order and which are specific enough to be used in identifying significant similarities and differences among different content sources. The order among classes suggested by a hierarchy seems especially promising in this regard.

Identifying an Appropriate Unit of Observation

Imagine that an investigator has developed a precise and acceptable definition of content and has selected a widely-used taxonomy which is consistent with his/her purposes. S/he would still not be fully equipped to conduct a meaningful analysis of a given content source (standardized test, set of objectives, textbooks or classroom instruction). Another critical decision that has to be faced is the selection of an appropriate unit of observation.

The following schematic diagram illustrates the general set of procedures an investigator could follow in attempting to describe the content covered by a given source. Specifically, the diagram portrays the general steps we followed in classifying one item on a standardized test.



The diagram obviously oversimplifies the classification process. It seems to imply a particular order, even though there are dynamic interactions among the various components. The diagram does, however, serve to highlight five critical decisions involved in the classification process: (It also serves to show how we dealt with this process in the development of our taxonomy of mathematics content.)

1. The investigator must carefully delineate what he is trying to describe. In our classification of standardized tests, for example, we decided to attempt to describe the content covered in the entire test; an alternative would have been to describe the content of each subtest.

2. The investigator must decide how to divide what he is trying to describe into meaningful subsets which will serve as the units of observation. This decision posed no particular problem in our analysis of standardized tests; the logical units of observation were individual test items.

3. During the actual content analysis, the investigator must infer the content which is suggested by a given unit of observation. A partial list of the broad array of content suggested by the test item $\begin{array}{r}64\\ \underline{-35}\end{array}$ is presented in the diagram.

4. The investigator must select or develop a taxonomy which describes meaningful content categories. The primary goal is to select a taxonomy which provides an adequate description of the content suggested by given units of observation. We developed a taxonomy which described mathematics topics in terms of three dimensions of a matrix because we felt that this level of generality provided the best descriptions of the principal intent of individual test items.

5. Because the content suggested by a given unit of observation is

apt to include a broad array of general intents (see example provided in diagram), the investigator must establish an a priori decision rule to limit the range of content s/he will consider. During our efforts to describe the content of standardized tests, for example, we considered only that content suggested by a given item which (a) reflected the primary intent of the item and (b) could be adequately described by one or more categories in our taxonomy. For the item in this example, the decision rule dictated that "subtraction with borrowing" was the suggested content which should be considered for the operations dimension of our taxonomy. Thus, a tally of "1" was entered in the category with this label.

A general analysis of these five classification decisions suggests there are substantial differences between the problems inherent in the classification of the content of standardized tests or lists of instructional objectives and the problems involved in classifying the content of textbooks or classroom instruction. Most of these differences stem from the fact that standardized tests and lists of objectives consist of sets of discrete content units, while the content of textbooks and classroom instruction is not as neatly organized and occurs as a continuous flow.

Finding a Taxonomy Which Fits the Unit of Observation

The segmental nature of standardized tests and lists of objectives greatly simplifies the task of developing meaningful subsets to serve as units of observation. The only logical units of observation appear to be individual test items, in the case of the exams, or individual objectives, in the case of the objectives. An asset of these units is that taken direct function of the level of specificity of the taxonomic categories. An investigator classifying content in terms of an entire subject matter area (e.g., mathematics, reading, or social studies) is apt to select the entire textbook or the course itself as the unit of observation. An investigator identifying topics in a given textbook, on the other hand, will probably select a more specific unit of observation, such as paragraphs or lessons.

It is possible for the level of specificity suggested by a taxonomy to demand observational units which are so specific that they miss the essence of what is being taught. A lesson which focuses on division, for example, might begin with two or three multiplication problems which illustrate the relationship between multiplication and division. If the units of observation are too specific, these problems might be recorded as multiplication even though the obvious intent of the lesson is to teach division. For these and other reasons, we have deliberately elected to develop a taxonomy which describes topics, and we will search for an observational unit which best reflects this level of generality when we begin our classroom observations.

Selection of a unit of observation should not, as this discussion seems to imply, be based solely on the desire to match taxonomic categories and observational units. Our deliberations have indicated that at least two other criteria must also be applied. First, the appropriate observation unit should be a direct function of the investigator's definition of content; the observation unit that we select for our classroom observation studies, for example, will somehow have to represent the intersection between a teacher's intentions and the instructional events s/he judges to be consiste .. with these intentions. Second, the observational unit must also reflect the natural organization of textbooks or classroom instruction. Chapters, subchapters, and paragraphs, for instance, are consistent with the natural organization of a textbook; pages which arbitrarily divide the text are not. The example about the lesson on division cited earlier illustrates how overly specific units of observation might fail to capture the natural organization of a lesson.

Summary

The selection of an appropriate unit of observation in content analyses of textbooks and classroom instruction is a complex issue. Somehow, an investigator must seek to identify a unit of observation which takes into account the need to match observational units and categories in the taxonomy, to be consistent with his definition of content, and to represent the natural organization of that which is being described.

Conclusion

Communication is the common theme which underlies the discussion of each of the three issues described in this paper. Until we begin to arrive at a common definition of the concept of content of instruction, undertake a serious analysis of the taxonomies we are using, and critically examine the units of observation we employ, it will be extremely difficult for those of us concerned with the content of instruction to communicate clearly and openly with each other. The purpose of this paper has been to facilitate discussion of these three issues and to stimulate more detailed reporting practices. Both activities--discussion <u>and</u> detailed reporting--are prerequisites to the successful resolution of the basic conceptual issues which underlie our efforts to study the content of instruction.

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